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Predation on terrestrial molluscs by scorpions in the Kalahari Desert

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SYNOPSIS

A description is given of how *Opisthophthalmus carinatus histrio* (Scorpionida, Scorpionidae) was found to feed on two small species of terrestrial molluscs in the Kalahari Gemsbok National Park, South Africa. Field and experimental observations suggest that these scorpions resort to this unorthodox diet only when there is a marked decrease in the availability of normal prey.

INTRODUCTION

It is generally accepted that the diet of scorpions is composed of various arthropods. A few species have however been found to occasionally kill and eat small vertebrates such as mice and lizards. As far as I know, no instance of a scorpion feeding on molluscs has ever been reported. The purpose of this short paper is to report on such an occurrence, discovered while conducting a general survey of the arachnid fauna of the Kalahari Gemsbok National Park in April–May 1970.

This survey was partly sponsored by the National Parks Board of Trustees and I wish to thank the Director and staff of this institution for all the help and facilities provided. I am also indebted to Dr. A. C. van Bruggen of Leiden University for identifying the molluscs mentioned in this paper.

FIELD AND EXPERIMENTAL OBSERVATIONS

Predation on molluscs was discovered quite fortuitously. Having run out of vials while collecting specimens along the calcrete banks of the Auob River (at a point 32 km north of Twee Rivieren), I had no option but to place five live specimens of *Xerocerastus* (*Xerocerastus*) *burchelli* (Gray), 1834 (Mollusca, Subulinidae) in a vial containing a live specimen of *Opisthophthalmus carinatus histrio* Thorell, 1877 (Scorpionidae). These molluscs had their apertures closed by an epiphragm, indicating that they were aestivating.

On opening the vial containing the scorpion that evening, it was noticed that three of the shells were broken in half, their contents having been eaten (as in fig. 2*b*), and that the scorpion was feeding on a fourth one. To ensure that this occurrence had not been triggered off by some unnatural circumstances, the following experiment was carried out. Three groups of scorpions composed of five specimens each of *O. carinatus histrio* (see A, B and C, table 1) were given artificial shelters in boxes with calcrete gravel substratum.

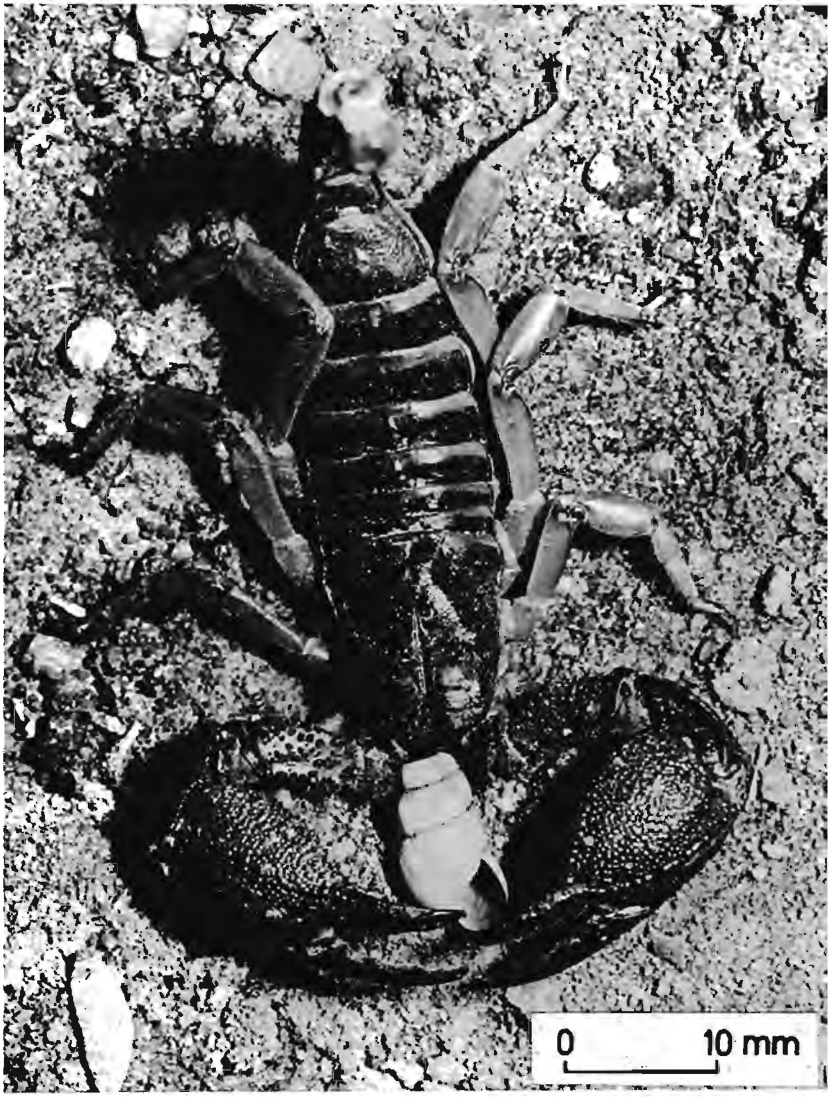

Fig. 1. *O. carinatus histrio* with broken shell of a *X.* (*X.*) *burchelli* on which it fed.

Each box contained only one scorpion. These scorpions were left undisturbed for 48 hours to allow them to settle in their artificial habitat. After this period the five specimens of A were each given three live specimens of *X.* (*X.*) *burchelli*; those of B received the same number of live shells and water in bottle-caps; those of C each received three live shells and four or five live insects. After 48 hours a count was made of prey eaten. The results appear in table 1.

TABLE 1

RESULTS OF TESTS ON DIET PREFERENCE OF *O. carinatus histrio*.

	A	B	C
Number of scorpions tested	5	5	5
Diet	Live shells, no water.	Live shells and water.	Live shells and insects.
Results . .	— 3 of the scorpions ate the content of 2, 1 and 3 shells respectively.	— 2 of the scorpions ate the contents of 3 and 2 shells respectively. — all scorpions drank water.	— no shell contents eaten. — all insects eaten.

Inspection of burrows of *O. carinatus histrio* in the field yielded the following: on the calcrete banks of the Auob River (at a point 32 km north of Twee Rivieren), a few bleached shells of *X.* (*X.*) *burchelli* broken in the manner illustrated in fig. 2*b*, were found among the gravel rubble at the mouth of six burrows out of a total of 22 investigated. Near Ooikolk (approximately 75 km north of Twee Rivieren) inspection of burrows along the calcrete banks of the Nossob River yielded a few similarly broken shells of *Xerocerastus* (*Xerocerastus*) *schultzei* (Boettger), 1910, at the mouth of five out of 17.

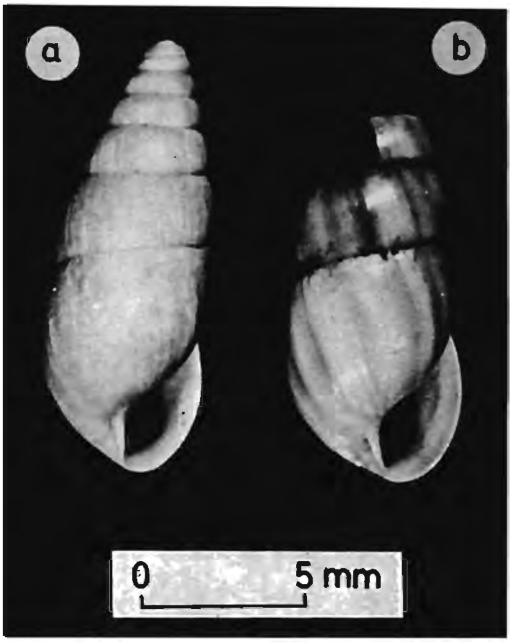

Fig. 2. Shells of *X.* (*X.*) *burchelli*:
a, an unbroken bleached shell;
b, a shell broken in the vicinity of the antepenultimate whorl by a specimen of *O. carinatus histrio*.

When digging out the burrows of *O. carinatus histrio* in the field no specimens were found actually feeding on live molluscs. Of the experimental animals only two were observed in the process of eating specimens of *X.* (*X.*) *burchelli*. While no scorpions were seen actually breaking a shell in order to feed on the contents, it is surmised that they use the powerful chelae of their pedipalps for this purpose. Most of the shells eaten by the experimental animals had been broken in half in the vicinity of the antepenultimate whorl (fig. 2*b*). The pedipalp chelae are used to hold large broken halves while feeding (fig. 1) and small portions are handled by the chelicerae alone.

O. carinatus histrio occurs only where the banks of the Auob and Nossob Rivers consist of calcrete formations, and it is very seldom found in the extensive dune system which covers most of the Gemsbok Park.

X. (*X.*) *burchelli* and *X.* (*X.*) *schultzei* occur in large numbers along the calcrete banks of the Auob and Nossob Rivers respectively. Two other smaller species of molluscs are also fairly common along the calcrete banks of the Auob and it is possible that they are also preyed upon by *O. carinatus histrio* although no evidence was found to support this. These two small species are *Pupoides calaharicus* (Boettger), 1886 (Pupillidae) and *Sculptaria namaquensis* Zilch, 1939 (Corillidae).

DISCUSSION

The observations presented above were made at a time when the Kalahari Gemsbok Park was unusually arid due to a delay in the arrival of summer rains. This was well reflected by the paucity of insect life witnessed in the course of day and night collecting as well as the scarcity and general poor condition of arachnids caught. In addition most of the live molluscs collected had their aperture closed by an epiphragm, thus indicating that they were in a state of aestivation.

These considerations linked to the experimental results of table 1 strongly suggest that the molluscs eaten do not form part of the normal diet of *O. carinatus histrio*, but that instead they are eaten only when there is a marked decrease in the availability of normal prey.